

LIST OF FIGURES

Figure 1.	Relationship of ITOUGH2 to the TOUGH2 family of codes.....	2
Figure 2.	ITOUGH2 inverse modeling flow	4
Figure 3.	Version control of ITOUGH2 run.....	7
Figure 4.	Simplified ITOUGH2 flow chart showing connection between TOUGH2 and ITOUGH2.....	9
Figure 5.	ITOUGH2 file structure on UNIX platform	15
Figure 6.	Five-spot well pattern with grid for modeling 1/8 symmetric domain ...	18
Figure 7.	Solution of the forward problem with TOUGH2 and ITOUGH2.....	19
Figure 8.	Calibration and prediction of pressures, temperatures, water and vapor flow rates.....	22
Figure 9.	Objective function, solution path, and 95 % confidence region.	23
Figure 10.	Excerpt of ITOUGH2 input file.	25
Figure D.1.1.	Schematic of synthetic laboratory experiment.....	43
Figure D.1.2.	TOUGH2 input file <i>sample</i>	44
Figure D.2.1.	Part 1: ITOUGH2 input file <i>part1i</i>	45
Figure D.2.2.	Part 2: ITOUGH2 input file <i>part2i</i>	47
Figure D.2.3.	Part 2: Excerpt from ITOUGH2 plot file <i>part2i.col</i>	47
Figure D.3.1.	Part 3: ITOUGH2 input file <i>part3i</i>	49
Figure D.3.2.	Part 3: Escrpt from ITOUGH2 output file <i>part3i</i>	50
Figure D.4.1.	Part 4: ITOUGH2 input file <i>par4i</i>	52
Figure D.4.2.	Part 4: Pressure transient center of column.....	55
Figure D.4.3.	Part 4: Flow rates at inlet	55
Figure D.5.1.	Part 5: ITOUGH2 input file <i>part5i</i>	57
Figure D.5.2.	Part 6: Excerpt of ITOUGH2 input file <i>part6i</i>	58
Figure D.5.3.	Part 6: Excerpt of ITOUGH2 output file <i>part6i.out</i>	59
Figure D.5.4.	Part5/6: Comparison between FOSM and Monte Carlo error propagation analysis	60

LIST OF TABLES

Table 1	Qualification status of TOUGH2 related software.....	1
Table 2.	Stepwise Procedure of Parameter Estimation by Inverse Modeling	3
Table 3.	Levenberg-Marquardt Algorithm	12
Table 4.	Summary of Major ITOUGH2 Arrays.....	13
Table 5.	Summary of Validation Problems for ITOUGH2	17
Table 6.	True, Initial, and Estimated Parameter Set	19
Table 7.	Observations Used for Model Calibration.....	20
Table 8.	True, Initial, and Estimated Parameter Set	20
Table 9.	Variance-Covariance Matrix (Main Diagonal and Lower Triangle) and Correlation Matrix (Upper Triangle)	20
Table 10.	Requirements Validation Cross-Check	24
Table D.1.1.	Summary of Issues Addressed by Sample Problem	45